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cankers on the twigs. Twig cankers due to the black rot fungus (*Sphaeropsis*) is also reported as being frequent. Apple scurf, a twig disease, is described as due to *Phyllosticta* or *Phoma prunicola*.—E. MEAD WILCOX.

The roots of *Lycopodium Selago*.—MISS SAXELBY⁵ has studied the origin of the roots of *Lycopodium Selago*, working with young plants grown from bulbils. She reports that the roots arise near the apex of the stem, but below the first leaves, and grow down through the cortex of the stem, emerging at the level of the ground. It is probable that "origin below the first leaves" is too sweeping a statement, for in preparations made by the reviewer from the same species the roots usually arise higher up than the first leaf. Miss SAXELBY finds that the dermatogen of the root arises from several cells of the innermost layer of the stem periblem; while the periblem and plerome arise from the plerome of the stem. It is interesting to note that the author finds three meristematic regions: plerome, periblem, and a dermatogen which forms both epidermis and root cap. The roots are usually diarch, with the metaxylem in the form of a horseshoe; but they may be tetrarch, with the metaxylem in two parallel bands; or there may be a transition between the two conditions.—ALMA G. STOKEY.

Germination of *Fucus*.—KNIEP finds ninety pages barely sufficient to relate and discuss the observations of three and a half months, at Bergen, on the physiology of fertilization and germination in *Fucus serratus*, *F. vesiculosus*, and *F. spiralis*.⁶ After a serious attempt it appears impracticable for the reviewer to discover in this voluminous paper the author's results and conclusions, for he does not make clear the outcome of his work, nor anywhere give so much as a line by way of summary regarding a single topic. His observations were directed particularly to the influence of external factors on the gametes and sporelings. The main topics are the effect of concentration of the total salts in sea water upon the movement of sperms, fertilization, germination, and geographical distribution; the influence of temperature (brief); the directive and formative effects of light; certain phases of regeneration in sporelings; and finally the possible induction of polarity by chemical stimuli.—C. R. B.

Californian Hepaticae.—HUMPHREY publishes together a series of notes on the physiology and morphology of certain Californian Hepaticae.⁷ He reports that *Fossombronia longiseta*, *Fimbriaria californica*, *Aneura multifida*, *Anthoceros Pearsoni*, and *Porella Bolanderi* are infested commonly with fungi, parasitic in the first case, symbiotic in the second, and epiphytic in the last three. In *Fegatella conica* fertilization occurs in early spring, the spores pass the dry

⁵ SAXELBY, E. MARY, The origin of the roots in *Lycopodium Selago*. *Annals of Botany* 22:21-33. pl. 3. 1908.

⁶ KNIEP, H., Beiträge zur Keimungs-Physiologie und -Biologie von *Fucus*. *Jahrb. Wiss. Bot.* 44:635-724. figs. 12. 1907.

⁷ HUMPHREY, H. B., Studies in the physiology and morphology of some California Hepaticae. *Proc. Wash. Acad. Sci.* 10:1-50. pls. 1, 2. 1908.

season in the tetrad stage, and mature early in January. Various adaptations to a dry season are noted. Hygrophilous species are unable to recover from desiccation, but both thallus and spores of xerophilous ones grow promptly even after complete artificial desiccation. The remaining studies are concerned with the germination of spores of various species, and the brief life of the green or thin-walled spores, as contrasted with those of certain xerophilous species which are known to be viable after two years.—C. R. B.

Florida strangling figs.—BESSEY⁸ has studied the germination and habits of the two native figs of Florida (*F. aurea* and *F. populnea*). In dense hammocks *F. aurea* begins only as an epiphyte, but eventually all trace of this habit is lost; while in open places it is often independent from the first. This seems to be explained by the fact that the seeds germinate only in the light, and experiments were performed to prove this peculiar habit. Following germination, the usual gradual "strangling" of the host plant occurs. Roots are sent down along the host plant and established in the ground, and finally by anastomosing and growth they completely incase the host. Both species have two or more crops of fruit each year, and are pollinated by different species of Blastophaga. Both kinds of flowers occur in the same receptacle, and the differentiation of the flowers is not so extreme as in the commercial fig.—J. M. C.

Morphology of *Asimina triloba*.—HERMS⁹ has discovered the following facts in a study of *Asimina triloba*: the ovule passes the winter in a stage preceding the differentiation of the archesporial cell; the megaspore tetrad is occasionally tetrahedral instead of linear; the embryo sac becomes remarkably elongated; the polar nuclei remain in contact for three weeks or more; the antipodals are very ephemeral; the first segmentation of the egg does not occur for three or four weeks after fertilization; the first division of the endosperm nucleus is accompanied by transverse wall formation, dividing the linear sac into two equal chambers, the transverse divisions continuing until the sac contains a linear series of about twelve cells, when longitudinal division begins at the antipodal end; the embryo is very small and little organized even in the seed.—J. M. C.

Light and germination of fern spores.—LIFE¹⁰ has been experimenting with the effect of light of different intensities upon the germination of fern spores. The spores of *Alsophila australis* germinated about a year after collection, but the spores of other ferns germinated as soon as they were dry. Under ordinary conditions the spores do not germinate in darkness; and at higher temperature

⁸ BESSEY, ERNST A., The Florida strangling figs. Rept. Mo. Bot. Garden 1908: 25:33. pls. 1-9.

⁹ HERMS, WILLIAM B., Contribution to the life history of *Asimina triloba*. Ohio Naturalist 8:211-217. pls. 15, 16. 1907.

¹⁰ LIFE, A. C., Effect of light upon the germination of spores and the gametophyte of ferns. Ann. Rep. Mo. Bot. Gardens 19:109-122. 1907.